Dr. Thibault Candela
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Research Interests

- **Fracture mechanics**
- **Fluid flow in fractures**
- **Geomechanics**
- **Experimental geophysics**
- **Petrophysics**
- **Seismology**

Background

June 2014-Present **Research Scientist at Baker Hughes**, Rio de Janeiro Research and Technology Center (Brazil).

May 2012-June 2014 **Postdoctoral Research Scientist**, The Pennsylvania State University, Department of Geosciences, University Park (U.S.).

Experimental investigation of the affect of dynamic stress on poromechanical properties of rocks.

- Design, perform and analyse rock mechanical tests (true triaxial pressure vessel inside a biaxial loading apparatus) ; Microstructural analysis (SEM) ; Linear poro-elasticity ; DLVO theory.
- Understanding the physical basis for transient changes in permeability and improving engineering approaches for oil reservoir and hydrological use.

Sept. 2011-May 2012 **Postdoctoral Research Scientist - Fulbright grant**, University of California, Santa Cruz (U.S.) - Earth and Planetary Sciences Department.

Granular flow rheology and fault roughness properties at the grain scale.

- White Light Interferometry measurements; Particle size measurement; Microstructural analysis (SEM); Field observations ; Fracture & granular mechanics.
- Link between the grain size and the adjacent fault surface : grain rearrangement plays a role in controlling the shape/resistance of the fault surface.

2007-2011 **PhD in Geophysics**, Institut des Sciences de la Terre, Observatoire des Sciences de l'Univers de Grenoble, France.

Roughness of fault surfaces: analyses and implications for the heterogeneity of seismic ruptures.

- Combination of numerical analysis, theory and field observations (fault drilling) ; High resolution topographic measurements (LiDAR, laser profilometer) ; microtomography ; Microstructural (SEM) and mineralogical analysis (microfluorescence X) ; Mechanics of crack propagation ; Linear elastic fracture mechanics ; Earthquake seismology ; Signal processing tools (Fourier transform, Correlation function, Wavelet transform).
- The fault roughness follows a self-affine anisotropic regime from the scale of hundred of micrometers to the thickness of the seismogenic crust.
- Origin of the fault roughness : mechanical interaction and coalescence of multi-scale segments.
- Numerical model of rupture propagation on a heterogeneous interface : link between the 3-D fault roughness and the 2-D spatial distribution of the slip.

2006-2007 **Master in Earth Sciences**, Geosciences Montpellier, University of Montpellier 2, France.

Deformation analysis of a seismic young fault (Taiwan).

- Structural, microstructural analysis (SEM ; High resolution cathodoluminescence) ; Fluid-rock interaction analysis (Electron Microprobe) ; Particle size/shape analysis.

Teaching Experience

2010-2011 **Temporary Teacher-Researcher**, Institut des Sciences de la Terre, Observatoire des Sciences de l'Univers de Grenoble, France.

2007-2010 **Teaching Assistant**, Institut des Sciences de la Terre, Observatoire des Sciences de l'Univers de Grenoble, France.

- *Geological mapping, Structural geology, Geomorphology (Bachelor students).*
- *Field courses in Sedimentology, Sequential stratigraphy, Geomorphology, Structural analysis and analytical tectonics (Bachelor students).*

Diplomas

2007-2011 **PhD Thesis in Geophysics**, Institut des Sciences de la Terre, Observatoire des Sciences de l'Univers de Grenoble, France.

2006-2007 **Master Thesis in Earth Sciences**, University of Montpellier 2, France.

Publications

[17] Candela et al., **2014**. The flow rate controls the permeability enhancement in laboratory experiments. In preparation.
[16] Faoro et al., **2014**. Evolution of the Transport Properties of Fractures Subject to Thermally- and Mechanically-Activated Mineral Alteration and Redistribution. In preparation.
[15] Candela et al., 2014. Fault roughness at the grain scale: the onset of isotropy. In preparation.
[14] Jolivet et al., **2014**. The burst-like behavior of aseismic slip on a rough fault: the Haiyuan fault creeping segment. Submitted to Geophysical Research Letters.
[13] Candela et al., **2014**. Laboratory evidence for particle mobilization as a mechanism for permeability enhancement via dynamic stressing. Earth and Planetary Science Letters.
[12] Riviere et al., **2013**. Dynamic acousto-elasticity in Berea sandstone: Influence of the strain rate. Journal of the Acoustical Society of America.
[11] Goebel et al., **2013**. Seismic event distributions and off-fault damage during frictional sliding of saw-cut surfaces with predefined roughness. Geophysical Journal International.
[10] Fondriest et al., **2013**. Mirror-like faults and power dissipation during earthquakes. Geology.
[9] Renard et al., **2013**. Constant dimensionality of fault roughness from the scale of microfractures to the scale of continents. Geophysical Research Letters.
[8] Candela et al., 2012. Roughness of fault surface over nine decade of length scales. Journal of Geophysical Research.
[7] Candela et al., 2012. Segment linkage process at the origin of slip surfaces roughness: evidence from the Dixie Valley fault. Journal of Structural Geology.
[6] Renard et al., **2012**. Strength evolution of a reactive frictional interface is controlled by the dynamics of contacts and chemical effects. Earth and Planetary Science Letters.
[5] Tisato et al., **2012**. Experimental investigation of flash weakening in limestone. Journal of Structural Geology.
[4] Candela et al., 2011. Fault slip distribution and fault roughness. Geophysical Journal International.
[3] Candela et al., 2011. Stress drop during earthquakes: effect of fault roughness scaling. Bulletin of the Seismological Society of America.
[2] Angheluta et al., **2011**. Effect of surface morphology on the dissipation during shear and slip along a rock-rock interface that contains a visco-elastic core. Pure and Applied Geophysics.
[1] Candela et al., 2009. Characterization of fault roughness at various scales: implications of three-dimensional high resolution topography measurements. Pure and Applied Geophysics.

References

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